

The Aspect Experiment (class 1983)

(New Introduction)

The Philosophy of QM has been appearing recently in the popular and semi-popular press.

Ex 1 In Nov 1979 D'Signat published an article in Scientific American with the title: "The Quantum theory and reality". The sub-heading read as follows: "The doctrine that the world is made up of objects whose existence is independent of human consciousness turns out to be in conflict with QM and with facts established by experiment".

This caused a furor among physicists and also among philosophers. How could experiment prove the non-existence of an objective world. (cf Berkeleyan dogmatism v. Humean Skepticism) - to argue for the fact that something's existence cannot be proved to the proof of its non-existence).

Well what are the experiments which enable us to do experimental metaphysics?

2 on 28th Aug 1981 The Times carried a report. "Random Events across Frontier". The principal promoters were the experiment referred to was apparently a celebration run for Aspect's gift.

Note: There are 3 Aspect Experiments

1981 1.) More precise version of the Freedman-Clauser
Expt (1972)

1982 2.) The Aspect-Rapisarda expt. with
2-channel polarisers resulting
in a so-called 4-Correlated
experiment. Similar expt. is
being carried out at Catania
by Rapisarda's group.

1982 3.) The Time Aspect Experiment
with the optical Synchroniser.

The idea got lost to BDM 1951
 can further discussed by BDM
 and Pharon in 1957 and by
 BDM in 1964. But the first really
 product began to appear in 1975 and
 then 2 years later the experiment was
 actually made to work.

In the afternoon I went to
 tell the background to the
 experiment in the introduction of
 the report. The experiment is concerned with
 new ideas - I am not going
 have the idea that this will
 be a breakthrough and the experiment
 of that sort is not what I want
 but to see if I can get them that
 out in a bit.

By Alan Aspart Sean Doherty
 and Gerard Rogers.
 Using time - varying parameters,
 2-parameter test of BDM's hypothesis,

In March 1983 the funding time
 cannot to be the way, Farnham
 was never that high, and BDM
 the last year when the BDM
 which has been spent on BDM for
 the BDM 1982.

- not the experiment itself.

(9)	Fredrickson, Elmer	(1972)	✓
H-7	West, A. Allen	(1972)	x
H-8	Elmer	(1976)	✓
IS	Fry, Thompson	(1976)	✓
Ca	Hest et al.	(1981)	✓
Ca	Watt? - Charles Johnson	(1982)	✓
Ca	Wood Officer Sanders	(1982)	✓
2.)	Don - Dean?	p-p - O'Carroll	✓ ← (purchased 1975)

Lamark - Rechts, Richards (1976) ✓

2) l-mg belangdean causale has s=0
state of pruthaan (for food by u.w. shahar (1950))

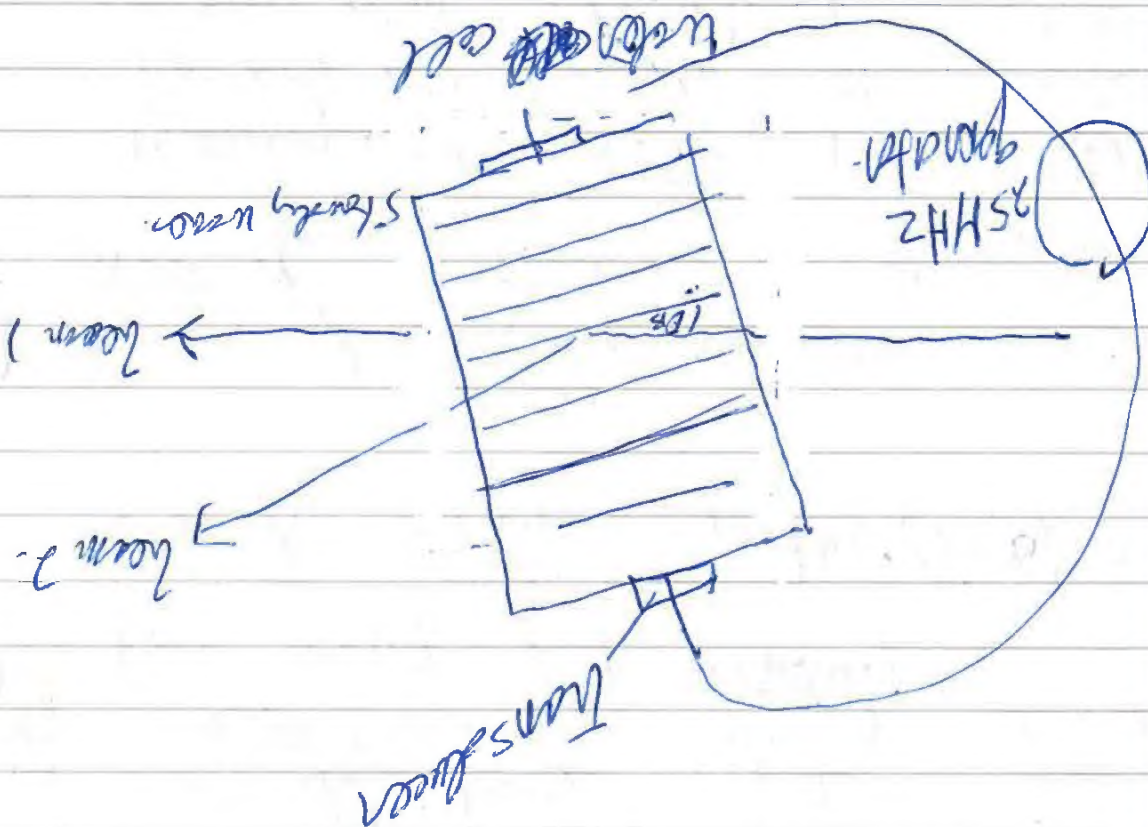
✓	Kashey old (1975)	✓	But Floor-Paving
X	Fareed old (1974)	X	emphatic strategy
✓	Brown old (1977)	✓	Practical for 20
✓	W. Lane, Burt's under (1976)	✓	announced for
			friction? later.

4) Recor. & notatle place in for
for 2 years - (Nd₂ mul. → 2.5% above)

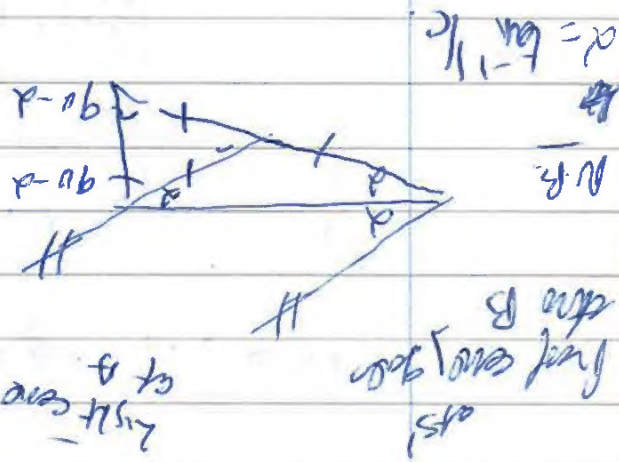
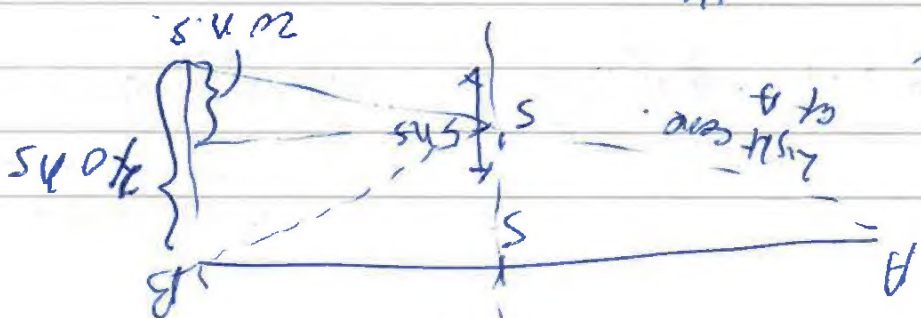
referred by Leo Stearns (1981)
 pp. 123, 3003-3012

11.3. This is internal between the things
 He stops in time to transmit information
 between the 5 units
 There was in time to transmit information
 to the source
 Smooth. about change every 10 ns.
 10. in 1/2 time after take from source to sink.

Range ang. $\theta_R = 5 \times 10^{-3}$ rad.
 Deflection = $2\theta_R = 10 \times 10^{-3}$ rad $\approx \frac{1}{2}^\circ$

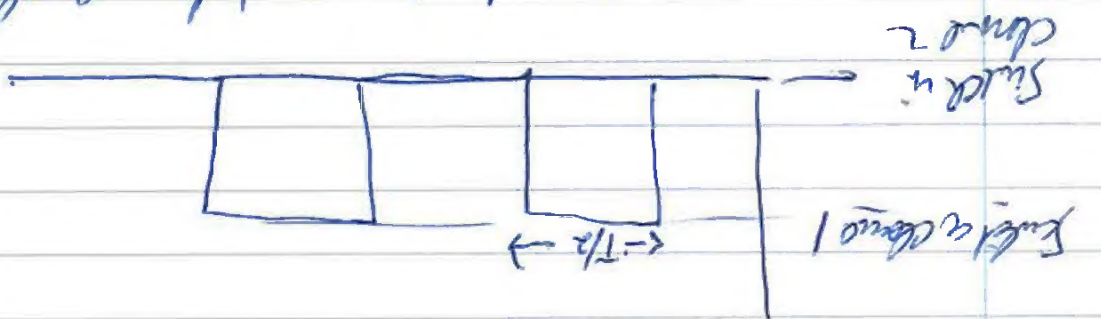


had the information
 photo is recorded
 ≈ 5 ns.



Switch used in studying wave in water cell taking as wave in water different getting

$T = \text{period of oscillation cycle}$



In actual experiment, frequency used was 50 MHz . (Time $= 10^{-8} \text{ s} = 10 \text{ ns}$)

Wave is sent around and it is received by the same frequency to observe frequency of 2.5 MHz

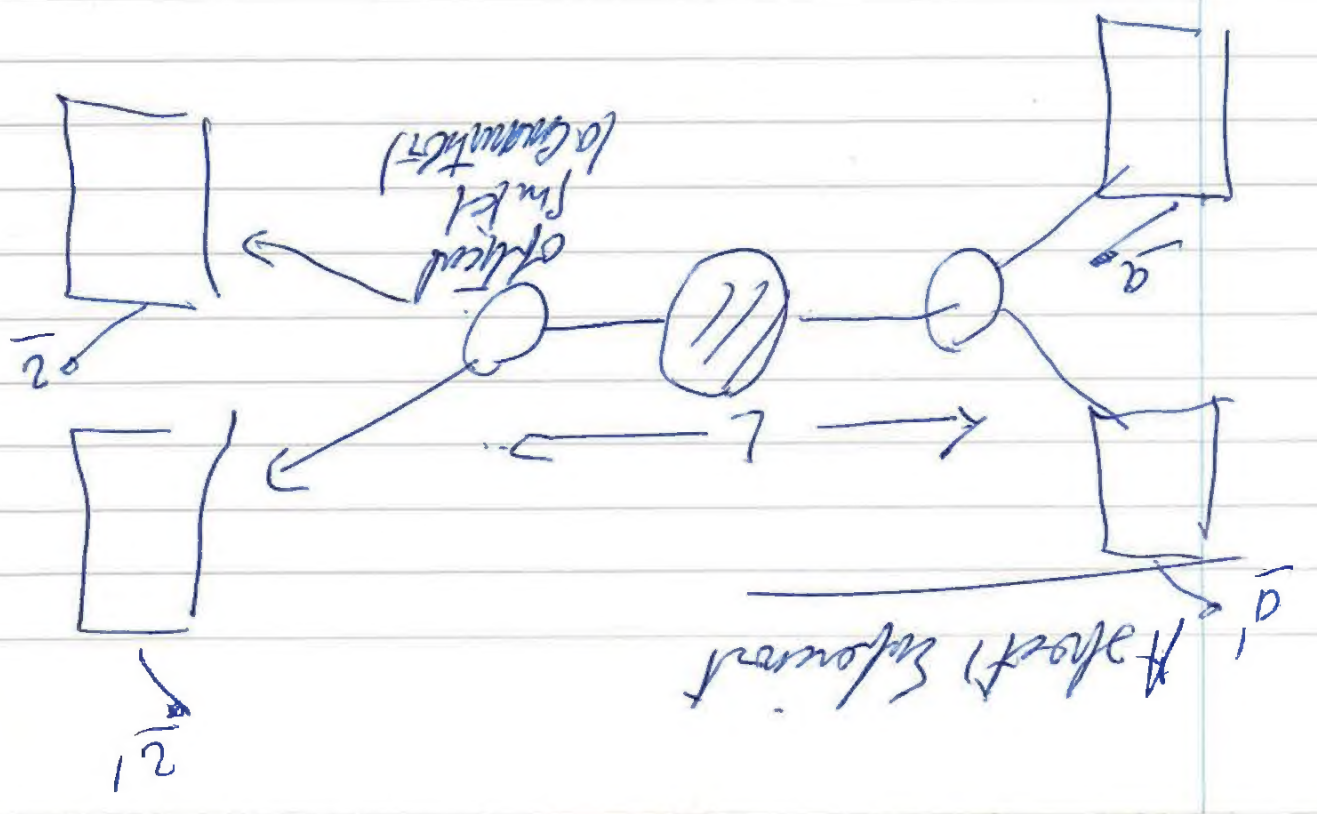
$$\text{Frequency} = 0.175 \times 10^8 \text{ Hz} = 1.75 \text{ MHz}$$

$$T = 2.8 \times 10^{-8} \text{ sec}$$

Frequency of oscillating the switch is $1/2.8 \times 10^{-8} \text{ sec}$

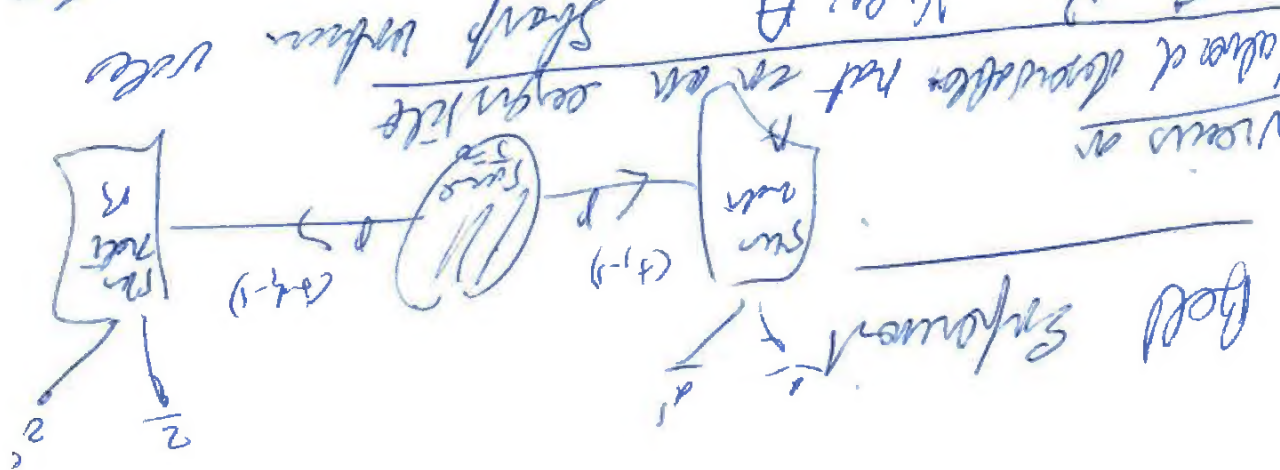
$$L = 12 \text{ meters} \quad \frac{L}{c} = 4 \times 10^{-8} \text{ sec} = 40 \text{ ns}$$

(1 nano-sec = 10^{-9} sec)



Rank	Team	Score
1	Team A	100
2	Team B	95
3	Team C	90
4	Team D	85
5	Team E	80

- | | | |
|---|---------------------|---|
| 1 | understand → defend | - |
| 2 | understand → defend | - |
| 3 | know → push | - |
| 4 | know → push | - |
| 5 | statistical effects | - |



3 Views on
Value of the

Views on
Value of knowledge not an objective sharp

9/2 New H

me B

500

1. $\frac{1}{2}$ of the population is in the
 2. $\frac{1}{4}$ of the population is in the
 3. $\frac{1}{8}$ of the population is in the
 4. $\frac{1}{16}$ of the population is in the
 5. $\frac{1}{32}$ of the population is in the
 6. $\frac{1}{64}$ of the population is in the
 7. $\frac{1}{128}$ of the population is in the
 8. $\frac{1}{256}$ of the population is in the
 9. $\frac{1}{512}$ of the population is in the
 10. $\frac{1}{1024}$ of the population is in the
 11. $\frac{1}{2048}$ of the population is in the
 12. $\frac{1}{4096}$ of the population is in the
 13. $\frac{1}{8192}$ of the population is in the
 14. $\frac{1}{16384}$ of the population is in the
 15. $\frac{1}{32768}$ of the population is in the
 16. $\frac{1}{65536}$ of the population is in the
 17. $\frac{1}{131072}$ of the population is in the
 18. $\frac{1}{262144}$ of the population is in the
 19. $\frac{1}{524288}$ of the population is in the
 20. $\frac{1}{1048576}$ of the population is in the
 21. $\frac{1}{2097152}$ of the population is in the
 22. $\frac{1}{4194304}$ of the population is in the
 23. $\frac{1}{8388608}$ of the population is in the
 24. $\frac{1}{16777216}$ of the population is in the
 25. $\frac{1}{33554432}$ of the population is in the
 26. $\frac{1}{67108864}$ of the population is in the
 27. $\frac{1}{134217728}$ of the population is in the
 28. $\frac{1}{268435456}$ of the population is in the
 29. $\frac{1}{536870912}$ of the population is in the
 30. $\frac{1}{1073741824}$ of the population is in the
 31. $\frac{1}{2147483648}$ of the population is in the
 32. $\frac{1}{4294967296}$ of the population is in the
 33. $\frac{1}{8589934592}$ of the population is in the
 34. $\frac{1}{17179869184}$ of the population is in the
 35. $\frac{1}{34359738368}$ of the population is in the
 36. $\frac{1}{68719476736}$ of the population is in the
 37. $\frac{1}{137438953472}$ of the population is in the
 38. $\frac{1}{274877906944}$ of the population is in the
 39. $\frac{1}{549755813888}$ of the population is in the
 40. $\frac{1}{1099511627776}$ of the population is in the
 41. $\frac{1}{2199023255552}$ of the population is in the
 42. $\frac{1}{4398046511104}$ of the population is in the
 43. $\frac{1}{8796093022208}$ of the population is in the
 44. $\frac{1}{17592186044416}$ of the population is in the
 45. $\frac{1}{35184372088832}$ of the population is in the
 46. $\frac{1}{70368744177664}$ of the population is in the
 47. $\frac{1}{140737488355328}$ of the population is in the
 48. $\frac{1}{281474976710656}$ of the population is in the
 49. $\frac{1}{562949953421312}$ of the population is in the
 50. $\frac{1}{1125899906842624}$ of the population is in the
 51. $\frac{1}{2251799813685248}$ of the population is in the
 52. $\frac{1}{4503599627370496}$ of the population is in the
 53. $\frac{1}{9007199254740992}$ of the population is in the
 54. $\frac{1}{18014398509481984}$ of the population is in the
 55. $\frac{1}{36028797018963968}$ of the population is in the
 56. $\frac{1}{72057594037927936}$ of the population is in the
 57. $\frac{1}{144115188075855872}$ of the population is in the
 58. $\frac{1}{288230376151711744}$ of the population is in the
 59. $\frac{1}{576460752303423488}$ of the population is in the
 60. $\frac{1}{1152921504606846976}$ of the population is in the
 61. $\frac{1}{2305843009213693952}$ of the population is in the
 62. $\frac{1}{4611686018427387904}$ of the population is in the
 63. $\frac{1}{9223372036854775808}$ of the population is in the
 64. $\frac{1}{18446744073709551616}$ of the population is in the
 65. $\frac{1}{36893488147419103232}$ of the population is in the
 66. $\frac{1}{73786976294838206464}$ of the population is in the
 67. $\frac{1}{147573952589676412928}$ of the population is in the
 68. $\frac{1}{295147905179352825856}$ of the population is in the
 69. $\frac{1}{590295810358705651712}$ of the population is in the
 70. $\frac{1}{1180591620717411303424}$ of the population is in the
 71. $\frac{1}{2361183241434822606848}$ of the population is in the
 72. $\frac{1}{4722366482869645213696}$ of the population is in the
 73. $\frac{1}{9444732965739290427392}$ of the population is in the
 74. $\frac{1}{18889465931478580854784}$ of the population is in the
 75. $\frac{1}{37778931862957161709568}$ of the population is in the
 76. $\frac{1}{75557863725914323419136}$ of the population is in the
 77. $\frac{1}{151115727451828646838272}$ of the population is in the
 78. $\frac{1}{302231454903657293676544}$ of the population is in the
 79. $\frac{1}{604462909807314587353088}$ of the population is in the
 80. $\frac{1}{1208925819614629174706176}$ of the population is in the
 81. $\frac{1}{2417851639229258349412352}$ of the population is in the
 82. $\frac{1}{4835703278458516698824704}$ of the population is in the
 83. $\frac{1}{9671406556917033397649408}$ of the population is in the
 84. $\frac{1}{19342813113834066795298816}$ of the population is in the
 85. $\frac{1}{38685626227668133590597632}$ of the population is in the
 86. $\frac{1}{77371252455336267181195264}$ of the population is in the
 87. $\frac{1}{154742504910672534362390528}$ of the population is in the
 88. $\frac{1}{309485009821345068724781056}$ of the population is in the
 89. $\frac{1}{618970019642690137449562112}$ of the population is in the
 90. $\frac{1}{1237940039285380274899124224}$ of the population is in the
 91. $\frac{1}{2475880078570760549798248448}$ of the population is in the
 92. $\frac{1}{4951760157141521099596496896}$ of the population is in the
 93. $\frac{1}{9903520314283042199192993792}$ of the population is in the
 94. $\frac{1}{19807040628566084398385987584}$ of the population is in the
 95. $\frac{1}{39614081257132168796771975168}$ of the population is in the
 96. $\frac{1}{79228162514264337593543950336}$ of the population is in the
 97. $\frac{1}{158456325028528675187087900672}$ of the population is in the
 98. $\frac{1}{316912650057057350374175801344}$ of the population is in the
 99. $\frac{1}{633825300114114700748351602688}$ of the population is in the
 100. $\frac{1}{1267650600228229401496703205376}$ of the population is in the
 101. $\frac{1}{2535301200456458802993406410752}$ of the population is in the
 102. $\frac{1}{5070602400912917605986812821504}$ of the population is in the
 103. $\frac{1}{101412$

$$\frac{1}{2} \left(\frac{1}{2} - \frac{1}{2} \right) = 0$$

The Quantifier Mean of the Gred (Boska)

Summary Version

Introduction (Displacement grade - max grade - Red buty with EPR, BSA, phase, see 7.5. Aspet. numerical with unambiguity. **Interpretation** of 'QH' - Quantifier Variation (Varying).

Pattern of Locality (ep 3 former 3 part)

E-PR phenomenon

$$If_{\text{quant}} = \frac{1}{2} (2(1) - 1(1) - 1(1) - 1(1))$$
 Show (12) \rightarrow EPR adjustment
 3 mean in displacement act as a separate

3 mean in what measurement also

You in the cherry bright about?

The EPR Measurement

Locality 1 depend (Red in Eastern Valley)
 Bork's response, Locality 2

EPR grad. QH + per-Bork's, a in can follow
 It is Eastern distance (quantifier) \rightarrow (quantifier)

Red grad. \rightarrow per-Bork's

opt of Locals 3

Show (10)

Show (11)

Show (12)

Show (13)

Show (14)

Show (15)

Show (16)

Show (17)

Show (12) } As neither $LC_1/3$ conflict with SP?
(Reverse Engineering)

Leads better as not one in circle
otherwise goes into 1005 not needed

Show (13) } Is local network a FR? Yes

Input result of Red Tables

Show (11) Identical results

Show (9) But on Voo B PLCP is perfect design
each station v for other design

Show (8) PLCP

Show (7) Is network

No Stack - Standard Network

No Network Environment Show (6)
(6c) out (6d) light source structure

No Red Frequency Show (5)

No Red Environment Show (3)

$LC_3 \rightarrow$ Red frequency

No Red Argument Show (3)

Proof of Bottom-Upward Proof

- 1) Derive CIR from VR > Prove^x

Show (1)

- 2) Allocator to selected system & CIR.

Show (2)

- 3) Completeness of CIR & validity

Proof of FVRC * *

$$[f(A \pm)]_4 \{L, A\}_3 (A, B) = f([A \pm]_4 \{L, A\}_3 (A, B))$$

get quite same as FVRC

But can be used to derive Completeness of System & VR - 1 system.

Comments

- 1) For 2 other classes of CIR in Completeness
- 2) Prove & transport no of packet then VR
- 3) What about Stochastic h.v. then VR space up packet on VR as R-H level of packet for (?) - VR about frequency = no of packets

Conclusion

Interrelation of Physics & Philosophy

- 1) Physics changed the light of philosophy
- 2) Philosophy was enriched by light of new theories in physics

Role of Philosophy in Physics

Don't let 'the package' as whole
 → provide understanding of physics

show slide ③

Final Remarks

— But the physics are understood
 it — because of physics and the study of physics

The role of philosophy in physics
 is to provide understanding of what
 physics means in contemporary world

Of course, theoretical physicists do not
 philosophical analysis of it and in other
 words - Einstein and Bohr are people
 examples. However, in the case of Einstein
 C. R. in twenty years to explain his
 philosophy. Like Bohr gave us a
 new understanding of the nature of the world,
 Kant and Hegel, Kant, to make
 sense of his sense.
 But the surprising thing is that neither
 philosophy is quite consistent with itself
 of a sense one could claim that Einstein
 did not understand relativity. But then
 both quantum mechanics. But then
 one can do physics without understanding
 it rather like looking at things without
 physics, anything about acid-base
 dynamics. But how much better to
 do physics and understand it to
 combine the study of physics and
 the study of philosophy of physics